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(54) MULTI-FILAR CATHETER BODY CONSTRUCTION

(57) The invention refers to a catheter, comprising a catheter tube, which defines a proximal end; a distal end; a longitudinal axis; a lumen therethrough; and a first zone having a first cut pattern segment therein, wherein the first cut pattern segment defines a plurality of spiral cuts spaced around a circumference of the tube, wherein each of the plurality of spiral cuts defines a width between 0.015 mm and 0.040 mm, wherein each of the plurality of spiral cuts is spaced from an adjacent cut by a filar having a width between 0.015 mm and 0.125 mm, and wherein each of the plurality of spiral cuts defines a pitch angle with the longitudinal axis between 30 degrees and 70 degrees.

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EUROPEAN SEARCH REPORT

Application Number
EP 23 16 5554

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 2021/338975 A1 (COTTONE ROBERT J [US]) 4 November 2021 (2021-11-04) * paragraphs [0157], [0158], [0184]; figures 1a,2a *	1-14	INV. A61M25/00
A	US 2020/038630 A1 (BESSELINK PETRUS A [NL]) 6 February 2020 (2020-02-06) * paragraphs [0033], [0039], [0069]; figures 1-6 *	1-13	
A	US 10 335 575 B2 (TERUMO CORP [JP]) 2 July 2019 (2019-07-02) * column 12, lines 24-55; figures 1,2 *	1-14	
A	US 2020/324080 A1 (BEECKLER CHRISTOPHER THOMAS [US] ET AL) 15 October 2020 (2020-10-15) * paragraphs [0038], [0042]; figure 2 *	1-13	
A	US 2013/331820 A1 (ITOU YOUICHI [JP] ET AL) 12 December 2013 (2013-12-12) * paragraphs [0057], [0065] - [0069]; figure 6 *	14	TECHNICAL FIELDS SEARCHED (IPC) A61M
A	US 2014/276117 A1 (BURKETT DAVID H [US]) 18 September 2014 (2014-09-18) * paragraphs [0022], [0031] - [0033]; figures 2,3 *	14	

~~The present search report has been drawn up for all claims~~

Place of search	Date of completion of the search	Examiner
Berlin	30 January 2024	Bielsa, David

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
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D : document cited in the application
L : document cited for other reasons

& : member of the same patent family, corresponding document

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Application Number
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CLAIMS INCURRING FEES

The present European patent application comprised at the time of filing claims for which payment was due.

☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due and for those claims for which claims fees have been paid, namely claim(s):

☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for those claims for which no payment was due.

LACK OF UNITY OF INVENTION

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

☐ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.

☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.

☒ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:

1-14

☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:

☐ The present supplementary European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims (Rule 164 (1) EPC).

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LACK OF UNITY OF INVENTION
SHEET B

Application Number
EP 23 16 5554

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. claims: 1-13

a catheter comprising a zone comprising a cut pattern segment defining a plurality of spiral cuts wherein the each of the cuts
-defines a width between 0.015 mm and 0.040 mm,
-is spaced from an adjacent cut by a filar having a width between 0.015 mm and 0.125 mm, and
-defines a pitch angle with the longitudinal axis between 30 degrees and 70 degrees.

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2. claim: 14

a catheter comprising a first zone comprising a cut pattern segment including 16 to 24 cuts wherein each of the cut defines a pitch angle with the longitudinal axis between 60 degrees and 70 degrees and a second zone comprising a cut pattern segment including 16 to 24 cuts wherein each of the cut defines a pitch angle with the longitudinal axis between 45 degrees and 55 degrees.

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3. claim: 15

a catheter comprising a zone comprising a cut pattern segment defining a plurality of spiral cuts and wherein the distal end of the catheter includes a tip segment having a plurality of helical segments extending around the longitudinal axis, wherein each helical segment includes two substantially parallel filars connected at distal ends thereof.

ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 23 16 5554

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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30-01-2024

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2021338975 A1	04-11-2021	CN 109789292 A	21-05-2019
		CN 115814236 A	21-03-2023
		EP 3522970 A1	14-08-2019
		JP 7349357 B2	22-09-2023
		JP 2019530519 A	24-10-2019
		JP 2022185129 A	13-12-2022
		US 2018093070 A1	05-04-2018
		US 2021338975 A1	04-11-2021
		WO 2018067824 A1	12-04-2018
US 2020038630 A1	06-02-2020	EP 3344323 A2	11-07-2018
		EP 3578221 A2	11-12-2019
		US 2019060612 A1	28-02-2019
		US 2020038630 A1	06-02-2020
		US 2022143362 A1	12-05-2022
		WO 2017037538 A2	09-03-2017
US 10335575 B2	02-07-2019	CN 105142709 A	09-12-2015
		EP 2990071 A1	02-03-2016
		JP 6077646 B2	08-02-2017
		JP WO2014174661 A1	23-02-2017
		US 2016082225 A1	24-03-2016
		WO 2014174661 A1	30-10-2014
US 2020324080 A1	15-10-2020	AU 2010241407 A1	16-06-2011
		CA 2721883 A1	30-05-2011
		CA 2994743 A1	30-05-2011
		CN 102078187 A	01-06-2011
		EP 2327365 A1	01-06-2011
		JP 5714312 B2	07-05-2015
		JP 2011115581 A	16-06-2011
		US 2011130648 A1	02-06-2011
		US 2020324080 A1	15-10-2020
US 2013331820 A1	12-12-2013	CN 102188236 A	21-09-2011
		EP 2364746 A1	14-09-2011
		JP 5399301 B2	29-01-2014
		JP 2011188913 A	29-09-2011
		US 2011224650 A1	15-09-2011
		US 2013331820 A1	12-12-2013
US 2014276117 A1	18-09-2014	NONE	

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